Remarks/Arguments

The Examiner is thanked for the courteous telephone interview granted Applicants' representative on March 24, 2004. This Amendment has been drafted to respond to comments made by the Examiner during the interview; and, it is believed, places the application in condition for allowance.

Claims 1-31 remain pending in the present application. Claims 1, 5, 8, 9, 12, 13, 17, 20, 21, 24, 25, 30 and 31 have been amended. No claims have been canceled and no claims have been added. Applicants believe the claims currently in the case patentably distinguish over the cited art, and that this application is in condition for allowance. Reconsideration of the rejection is, accordingly, respectfully requested in view of the above amendments and the following comments.

I. **35 U.S.C. § 102, Anticipation**

The Examiner has rejected claims 1-4, 6-7, 13-16, 18-19, 25-29 and 31 under 35 U.S.C. § 102(e) as being anticipated by U.S. Patent No. 6,493,656 to Houston et al. This rejection is respectfully traversed.

Houston et al. (hereinafter Houston) is directed to a method and apparatus for diagnosing hard or catastrophic types of failures in a storage device such as a hard disk drive. In Houston, when a hard error is detected, a set of error conditions is stored in a memory along with a command list to create an error log. The error log is then used as a source of information to assist in diagnosing the hard failures.

The present invention, on the other hand, is directed to a technique for reporting bit line or driver failures. According to the present invention, a predetermined number of consecutive correctable errors are detected in order to determine if descriptions for the predetermined number of correctable errors are the same. A bit line or driver failure is then reported if the descriptions are the same. By detecting a predetermined number of consecutive correctable errors, the present invention filters out random occurrences of intermittent errors to minimize false error reports.

In rejecting the claims, the Examiner states as follows:

> As per claim 1, Houston teaches a method for reporting failures, comprising of detecting a predetermined number of consecutive correctable errors (column 8, lines 60-67, 45-50); storing a description for each of the predetermined number of correctable errors (column 8, lines 37-39); determining whether the descriptions for the predetermined number of correctable errors are the same (column 8, lines 60-67); and reporting a bit line or driver failure if the descriptions for the predetermined number of correctable errors are the same (column 2, lines 49-54; column 8, lines 45-50).

Office Action dated February 23, 2004, page 2.

Claim 1 of the present application as amended herein reads as follows:

> 1. A method for reporting bit line or driver failures, comprising:
> detecting a predetermined number of consecutive correctable errors;
> storing a description for each of the predetermined number of correctable errors;
> determining whether the descriptions for the predetermined number of correctable errors are the same; and
> reporting a bit line or driver failure if the descriptions for the predetermined number of correctable errors are the same.

Houston does not disclose the step of detecting a predetermined number of consecutive correctable errors as recited in claim 1 (emphasis added). In particular, Houston does not disclose detecting a predetermined number of consecutive errors, whether correctable or otherwise. In rejecting the claim, the Examiner refers to column 8, lines 60-67 which reads as follows:

> The error log data structure pointer **414** points to the most recent error log data structure **416** contained in the error log data structure **410**. The error log data structure **416** entries are viewed as a circular buffer with a predetermined number of entries, such as five. An error log data structure pointer **414** value of zero indicates there are no valid error log data structures **416**. Values of 1-5 are valid and values over 5 are reserved and invalid (if only five entries are desired).

Nowhere does the above recitation indicate that a predetermined number of consecutive errors is detected. The recitation only states that the error log data structure

has a predetermined number of entries, such as five, not that the entries represent consecutive errors. Instead, in Houston the type of error information that is recorded includes the frequency of read error occurrences (see, for example, column 7, lines 26-29), the total number of errors recorded during the life of a drive and the time that an error was detected (see, for example, column 10, lines 59-65).

Accordingly, Houston does not disclose detecting a predetermined number of consecutive errors, and does not anticipate claim 1 for at least that reason.

In addition, Houston does not disclose detecting a predetermined number of consecutive correctable errors as recited in claim 1 (emphasis added). Figure 6 of Houston is a flow chart that depicts a method of performing an off-line read scan technique according to the preferred embodiment of Houston. A copy of Figure 6 is reproduced as follows for the convenience of the Examiner:

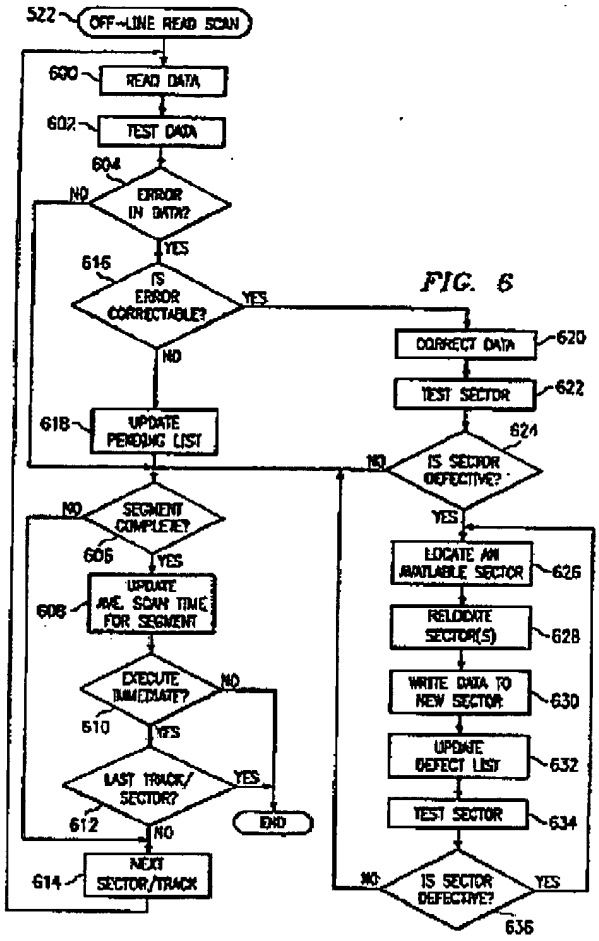

FIG. 6

As shown in Figure 6, when an error is identified, a determination is made in step 616 as to whether or not the error is correctable. If the error is correctable, it is immediately corrected in step 620 prior to any further processing. Thus, although Houston does, apparently, have a capability of detecting a correctable error, it does not attempt to detect any predetermined number of consecutive correctable errors. Houston simply corrects any correctable error that is found without regard to there being any consecutive number of correctable errors.

During the interview, the Examiner acknowledged the disclosure of Figure 6, but contended that this Figure represented only an embodiment of the invention in Houston. The Examiner referred specifically to column 8, lines 45-50 of Houston as disclosing that

correctable errors could be processed in the same manner as hard errors. Column 8, lines 45-50 of Houston reads as follows:

> For purposes of the error log, an error includes most errors trackable by the drive 118 including ATA errors (error bit "ERR" in the status register 317 set to one), uncorrectable data errors (UNC), requested ID not found (IDNF) errors, servo errors, write fault errors, read errors and hardware and software resets.

Applicants submit that the above recitation does not indicate that consecutive correctable errors may be detected. As indicated in Figure 6 of Houston, a correctable error can, apparently, be detected; however, when it is detected, it is simply corrected. Furthermore, in column 1, line 65 to column 2, line 5, Houston states:

> There are generally two general classes of failures that can occur in disk drives. The first class is the hard or catastrophic type of failure which causes the drive to quickly and unpredictably fail. These failures can be caused by static electricity, handling damage, or thermal-related solder problems. The second class of failures result from the gradual decay of other electrical and/or mechanical components within the drive after it is put in service.

Also, in column 2, lines 30-31, Houston states:

> Therefore, there is a need for an improved means for diagnosing hard failures in disk drives.

From statements such as the above, and the clear disclosure of the preferred embodiment in Figure 6 of Houston, it is believed contrary to the disclosure in Houston to interpret Houston as disclosing the various steps of claim 1 with respect to correctable errors.

Therefore, for this reason also, Houston fails to anticipate claim 1.

Furthermore, since Houston does not disclose detecting a predetermined plurality of consecutive correctable errors, the reference also fails to disclose the steps of storing a description for each of the predetermined number of correctable errors, and of determining whether the descriptions for the predetermined number of correctable errors are the same, as also recited in claim 1.

Claim 1, accordingly, is not anticipated by Houston and should be allowable in its present form.

Independent claims 13, 25 and 31 contain limitations similar to those in claim 1, and should also be allowable in their present form for substantially the same reasons as discussed above with respect to claim 1.

Claims 2-4, 6-7, 14-16, 18-19 and 26-29 depend from and further restrict one of independent claims 1, 13 and 25 and should also be allowable in their present form, at least by virtue of their dependency.

Therefore, the rejection of claims 1-4, 6-7, 13-16, 18-19, 25-29 and 31 under 35 U.S.C. § 102(e) has been overcome.

Furthermore, claims 1-4, 6-7, 13-16, 18-19, 25-29 and 31 would not be obvious in view of Houston. Houston is directed to diagnosing hard failures in a disk drive, whereas the present invention is directed to detecting a predetermined number of consecutive correctable errors in order to ensure, for example, that a detected error is not a spurious error that can cause a false error report. Houston is not directed to the same problem as solved by the present invention, and one of ordinary skill in the art would not be led to the present invention by the disclosure in Houston.

II. Objection to Claims

The Examiner has stated that claims 5, 8-12, 17, 20-24 and 30 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

By the present Amendment, claims 5, 8, 9, 12, 17, 20, 21, 24 and 30 have been rewritten into independent form incorporating all the limitations of their base claims and any intervening claims. Claims 5, 8, 9, 12, 17, 20, 21, 24 and 30, together with claims 10 and 11 that depend from claim 9, and claims 22 and 23 that depend from claim 21, should now be allowed.

Therefore, the objection to claims 5, 8-12, 17, 20-24 and 30 has been overcome.

III. Conclusion

For all the above reasons, claims 1-31 are believed to patentably distinguish over the cited art and to be allowable in their present form. This application is, accordingly, believed to be in condition for allowance, and it is respectfully requested that the Examiner so find and issue a Notice of Allowance in due course.

The Examiner is invited to call the undersigned at the below-listed telephone number if in the opinion of the Examiner such a telephone conference would expedite or aid the prosecution and examination of this application.

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Respectfully submitted,

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